

Book news

1. New books

● *1979 Louisville Coal Conference proceedings*. Epping (England), Bowker Publishing Co., 1980. 4 vols. \$43.00.

These four volumes contain the technical presentations of some 110 authoritative speakers on the most pressing coal problems of the 1980's. They contain the papers given at each of four concurrent sessions:

- 1 — Surface Mining and Reclamation
- 2 — Underground Mining
- 3 — Coal Preparation and Utilization
- 4 — Coal Management

● *Proceedings of a joint meeting of the Institution of Mining and Metallurgy, the Society of Mining Engineers of AIME, and the Metallurgical Society of AIME, held in London, 27 to 30 May, 1980*, by M. J. Jones (ed.). London, Institution of Mining and Metallurgy, 1981. 350 pp. £46.

This volume of papers and discussions on the national and international management of mineral resources contains definitive statements on the problems of consumer and producer countries and companies in relation to both long- and short-term supplies of mineral raw materials, and on the role of governments and governmental bodies in balancing supply and demand. In addition, a wide range of technical/scientific topics — exploration geology, mining, mineral processing, extractive metallurgy, economics and statistics — is reviewed. Thirty-seven papers, by authors from the United Nations, the European Community, national government agencies and companies and consultants from Australia, Canada, France, Germany, the United Kingdom, U.S.A., South Africa, and Zambia, were presented and discussed in 12 sessions: the potential problems of consumer companies; exploration strategy; metallurgical processes; exploration; statistic, politico-economic risk; investment problems of producer companies and countries; role of the IFC and the UN; new metallurgical approaches; oil and ocean mining; case studies; political problems of consumer countries; and policy.

● *Economic mineral deposits*, by M. L. Jensen and A. M. Bateman. 3rd ed. New York, John Wiley, 1981. 752 pp. \$22.95.

This is a thoroughly revised, updated examination of the broad spectrum of world mineral deposits, with a vast amount of statistical data on production, reserves, and mineral resources. It contains new chapters on mineral economics and exploration and the newly recognized bacteriogenic and exhalative volcanogenic processes. It eliminates previous chapters on structural geology, geophysical techniques, extractive metallurgical processes, and ground-water supplies, but includes new tables and illustrations, and metric units of measurement.

● *E & MJ international directory of mining and mineral processing operations*. Epping (England), Bowker Publishing Co., 1980. 1314 pp. \$67.00.

This is an international directory that provides authoritative information on the world's mineral pro-

ducers. It contains details of the organization and operating data for 5 100 company headquarters/mines/plants worldwide, plus an exclusive worldwide directory of nearly 1 500 mining consultants.

● *Physical methods in modern chemical analysis*, by T. Kuwana (ed.). New York, Academic Press, 1980. Vol. 2. 432 pp. \$38.25.

Like volume 1, each chapter in this volume covers the theory and principles on which a particular method is founded, gives a description of the instrumentation or equipment used, and illustrates the scope and power of the method by presenting several selected examples. The methods dealt with in this volume are as follows: high-performance liquid chromatography, X-ray photoelectron spectroscopy, X-ray diffraction of powders and metals, ion cyclotron resonance, and refractive index measurement.

● English translations of DIN standards. Available from the SABS, Private Bag 191, Pretoria 0001.

Every country has at times to refer to, or deal with, German Standards ('DIN-Normen'). The reason for this is twofold: goods and equipment are often ordered according to DIN standards, and exports to Germany are greatly facilitated if products conform to the relevant DIN standards. DIN standards are also of help in other areas, for instance in the field of materials testing. It is for these reasons that DIN, the German Institute for Standardization, is continuously translating its most important standards into English. The SABS has copies of these translations available for sale, and has just received DIN's 1980 comprehensive catalogue of all English translations (approximately 2 300) of its standards. This catalogue can either be consulted in the SABS library or it can be ordered through the Specification Sales Division. For all companies, institutions, or government departments having to deal occasionally with DIN standards, this catalogue should be of assistance.

● *Mining international year book*. London, Financial Times, 1981. 730 pp. \$90.00 airmail, £37.50 surface.

The year book contains detailed information on over 700 companies involved in the mining, production, and distribution of minerals and ores throughout the world. It provides accurate company information essential for all those concerned with every aspect of the mining industry. Each entry is revised and updated every year and is checked by the company concerned to ensure accuracy. The year book provides reported annual operating statistics, reflecting the activities of companies — large and small — within the mining industry. The general upturn in metal prices has been reflected in reported company results — encouraging plans for new acquisitions, development, expansion, and diversification.

● *Analytical atomic absorption spectroscopy. Selected methods*, by J. V. van Loon. New York, Academic Press, 1980. 360 pp. \$35.00.

This book will be of value to the practising analytical

chemist. The author begins with a brief presentation of theory in the first chapter. Subsequent sections of the first chapter include general information necessary for the application of atomic absorption to chemical analysis. The following seven chapters contain detailed methods for the analysis of water, geological samples, organic samples, air, alloy, petroleum products, and industrial samples. Chapter 9 considers the changing direction of analytical atomic absorption by listing procedures for the determination of the chemical forms of metals. In Chapter 10 the author concludes by speculating on the future of analytical atomic spectrometry.

2. NIM reports

The following reports are available free of charge from the National Institute for Metallurgy, Private Bag X3015, Randburg 2125, South Africa.

● Report no. 1848

An electrochemical and kinetic investigation of the behaviour of gold in chloride solutions. I. The cathodic deposition of gold. (First issued 7th Jul., 1976.)

The cathodic deposition of gold from acidic chloride solutions was investigated with the aim of improving the electrolytic-refining process in use at the Rand Refinery. The depositions were carried out using a vertical rod or a rotating disc as the cathode. An investigation was made of the influence, on the quality of the deposits, of current density, stirring intensity, temperature, concentration of gold(I), and composition of the electrolyte. The maximum applicable currents were found to correspond to the mass-transfer-controlled deposition of gold(III). The concentration of gold(I) had a marked influence on the quality of the deposit.

A series of runs using cells of the electrolytic-refining plant showed that stratification of the electrolyte occurs if no stirring is applied. Suggestions are made, resulting from both the laboratory and pilot experiments, that should result in an improvement of the electrolytic-refining operation.

● Report no. 1844

An electrochemical and kinetic investigation of the behaviour of gold in chloride solutions. II. The anodic dissolution of gold. (First issued 7th Jul., 1976.)

This investigation confirmed the formation of gold(I) in an intermediate step. The factors influencing the extent to which gold(I) accumulates in the solution were established, and a kinetic model that accounts for the various observations was developed. Cyclic voltammetry of gold in chloride solutions revealed that the formation of oxide is responsible for the passivation that occurs at potentials at which the rate of transport of chloride to the surface becomes limiting.

● Report no. 1846

An electrochemical and kinetic investigation of the behaviour of gold in chloride solutions. III. The gold(III)-gold(I) reaction on platinum and the disproportionation

of gold(I). (First issued 7th Jul., 1976.)

Various electrochemical techniques were used in a study of the kinetics of the gold(III)-gold(I) couple on platinum in chloride solution, and of the initial stages of the deposition of gold on platinum. Differences in the behaviour of anodically treated platinum electrodes and gold electrodes were observed, and mechanisms are proposed for the reaction at both surfaces. The rate of homogeneous disproportionation of gold(I) in chloride solutions was found to be very slow, but it is catalysed at the surface of gold metal. The loss of gold as volatile species from a typical electrolyte at 50°C was shown to be negligible.

● Report no. 1979

An electrochemical investigation of the behaviour of gold in chloride solutions. IV. Results obtained from Phase 2 of the investigation. (First issued 30th Jun., 1978.)

The effects of certain variables on the morphology and purity of gold cathodes were studied. The variables included temperature, current density, agitation, and the nature of the applied current. Both laboratory-scale and pilot-scale cathodes were used.

An unexpected correlation between the roughness and the purity of the cathodes was found. The more highly dendritic were the deposits, the less silver they contained as an impurity.

The applications of this and related findings to plant practice are discussed, and operating procedures are recommended.

● Report no. 2093

The measurement of electrical variables in a submerged-arc furnace.

The measurement of the electrical variables in a submerged-arc furnace is difficult owing to errors in the measurement of electrode-to-bath voltages and the difficulty involved in the maintenance of measurement connections in the hot, harsh environment of a furnace. The system proposed provides an accurate, reliable measurement of electrode-to-bath voltages for use in the determination of the electrical variables. A method for the measurement of arcing conditions under each electrode is also described.

The measurement system was used in an examination of the conduction mechanisms occurring in a furnace, and made a significant contribution to the understanding of the operation. In addition, a method for the determination of the lengths of the electrodes was established.

A problem with the measurement system is that connections have to be made in a very hot environment, and on occasion, when a furnace eruption occurs, the measurement leads have to be replaced. As a result, an indirect technique was developed for the determination of the resistances under each electrode, and this is used in the control of the power distribution in a furnace. All the measurements are taken on the primary side of the furnace transformers, where reliable connections can be made.

Steels for pipelines

Since welding was first introduced as a method of joining pipelines, gas-pipeline engineers have taken the opportunity to increase gas pressures, and hence increase the efficiency and economy of transporting gases. The use of thickwall pipes to contain the higher pressures soon gave way to the use of higher-strength steels in thinner-walled pipes, but the progress towards the highest pressures has been moderated by other considerations such as the necessity to take account of susceptibility to brittle fracture resulting from pipe or weld flaws or from external damage, especially where the pipes operate at low temperatures. In recent years, as pressures have approached 104 bar (1 500 lb/in²), increasing attention has had to be paid to resistance to ductile fracture.

Nevertheless, over the past twenty years, the strength of steels used for pipelines has steadily increased from 360 N/mm² to 480 N/mm².

At the present time, pipeline engineers are contemplating even higher pressures to maintain reasonably economical costs for transporting gas in the face of rising costs of pipeline construction and operation, and they

now require steels with strengths of 550 N/mm² to 590 N/mm² together with guarantees of toughness and weldability.

Vanadium has been an essential element in many specifications for higher-strength steel pipelines for oil as well as gas, and is indeed involved in several of the developments for the latest requirements. It is, therefore, appropriate that a conference on steels for pipelines and pipe fittings, which are of obvious interest in the light of general developments in pipeline construction, should take place in 1981 and form part of the celebrations for the 150th Anniversary of the Discovery of Vanadium.

Accordingly, The Metals Society is sponsoring, with the support of The Welding Institute, a three-day conference on pipelines and pipe fittings to be held in London on 21st to 23rd October, 1981, but the conference will not be restricted to vanadium steels.

Further information is available from the Conference Department, The Metals Society, 1 Carlton House Terrace, London SW1Y 5DB, England. Telephone 01-839 4071, Telex 8814813.

Envitec '83

The International Trade Fair and Congress for Engineering in Environmental Protection — the ENVITEC '83 — will take place in Düsseldorf from 21st to 25th February, 1983. This exhibition date was agreed upon at the constitutional meeting of the ENVITEC Committee. At the same meeting, Herr Dipl.-Kfm. Otmar Stollbrink, Chairman of the Board of Directors of the German Babcock Installation Building Corporation, was once again elected chairman of the ENVITEC Committee.

ENVITEC '83 is based on the same concept as previous

shows, and will include the following:

- International Trade Fair
- Congress with 'Raw Materials and the Environment' as its topic
- Seminars for exhibitors
- Information Centre, sponsored by the industry and administrative bodies.

Enquiries should be directed to the Düsseldorfer Messegesellschaft mbH-NOWEA, Postfach 320203, Düsseldorf 30, West Germany. Telephone: (0211) 45 60-1. Telex 8584853 mes d.